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10/040,114	10/25/2001	Jer-Chuan Huang	2041001	8779

7590 11/16/2004  
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EXAMINER

LE, BRIAN Q

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 11/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/040,114

**Applicant(s)**

HUANG, JER-CHUAN

**Examiner**

Brian Q. Le

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_.

*Specification*

1. The disclosure is objected to because of the following informalities: “Buber Space Telescope” is believed as “Hubble Space Telescope”.

Appropriate correction is required.

*Claim Rejections - 35 USC § 112*

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-9 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Regarding claim 1, the Applicant shows the support of “triangular element **matrices**” in the original specification (page 2, (a) paragraph) and not the support for the “triangular elements” alone. Similarly, the specification shows (page 2, (b) paragraph) support for the “matching-related flag **matrix**” and not the support for “matching-related flag **matrices**”. Furthermore, one skilled in the art does not understand the term “matching-related flag matrices”. Appropriate corrections are required.

Claims not specifically addressed depend from indefinite antecedent claims.

*Claim Objections*

4. Claims 1-9 are objected to because these claims are very difficult to understand due to the use of confusing language. Appropriate correction is required. The prior art rejection based on the Examiner’s best understanding.

*Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of George Bebis et al. "Fingerprint Identification Using Delaunay Triangulation", I.E.E.E. 1999, pages 452-459 and Hsu U.S. Patent No. 5,974,176.

Regarding claim 1, George teaches a triangle automatic matching method provides a unique and precise matching method that can be used to judge the similarity of two sets of planar points (The comparing/matching of fingerprint images utilizing the Delaunay Triangulation matching between the input image and the reference image) (abstract and FIG. 4), comprising: Generating a plurality of triangular elements (The concept of Delaunay Triangulation) (page 454, second column, second paragraph) and matching-related flag (Threshold flag) (page 457, first column, second paragraph) matrices upon a coordinate (page 456, first column, first paragraph); Determining a triangle weighting value combined with triangle coarse matching (minutiae matching by Delaunay Triangulation) depending on said triangular elements and said flag matrices (The matching of Delaunay Triangulation would requires triangular elements and flag matrices); Converting said coordinate depending on said triangle weighting value (Minutia represent by coordinate) (page 455, first column, second paragraph); and Calculate said similarity depending on said triangle weighting value (page 455). However, George does not explicitly teach the triangle automatic matching.

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Hsu teaches a method for automatic matching of planar point patterns between the reference and test patterns of fingerprint images (abstract and column 4, lines 17-38). Modifying George's method of triangle pattern matching method according to Hsu would be able to provide an automatic pattern matching with lower false rejection rate and able to process it at a high speed (column 2, lines 50-60). This would improve processing and therefore, it would have been obvious to one of ordinary skill in the art to modify George according to Hsu.

For claim 2, George further teaches the method wherein said first step further includes the generating a list of all the possible side of a triangle based on the vertices of each triangle (page 454, first column, second paragraph). George teaches the memory to store parameter/information (page 452, second and third paragraph). George does not explicitly teach the storing of 12 geometrical parameters in two matrices. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to store whether 12 geometrical parameters in two matrices or different number of parameters in different number of matrices. Applicant has not disclosed that the storing of 12 geometrical parameters in two matrices provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with storing whether 12 geometrical parameters in two matrices or different number of parameters in different number of matrices.

Therefore, it would have been obvious to one of ordinary skill in this art to modify George with the storing of 12 geometrical parameters in two matrices to obtain the invention as specified in claim 2.

Regarding claim 3, George teaches the method wherein said first step further includes

generating a matching related flag matrix under a plurality conditions (properties requirement of Delaunay Triangulation) (page 455, 4.2. Building the index table), and setting said flag matrix.

For claim 4, George also discloses the method wherein said triangle weighting value can to find the tendency of direction about the triangular elements and also to determine the shift and rotation parameters (affine transformation) (page 455, first column, third paragraph).

Referring to claim 5, George discloses the method wherein before said third step, flag matrix must first be verified, then going on with triangle coarse matching (The Delaunay triangulation process before matching process start) (page 455).

As to claim 6, George teaches the method wherein said triangle coarse matching is to filter out the impossible mated points of said triangle elements according to the geometrical parameter thereof in a input set and a reference set, then setting a plurality of predetermined conditions to determine whether said triangle element from said input set and said triangle element from said reference set are definitely mated or not (the concept of Delaunay triangulation matching) (page 457, second column). However, George does not explicitly teach if the geometric parameters do not satisfy said conditions, then discarding said elements. Hsu further teaches a method for automatic matching of planar point patterns between the reference and test patterns of fingerprint images (abstract and column 4, lines 17-38) wherein the matching method discard elements if the geometric parameters do not satisfy said conditions (coarse matching) (column 5, lines 35-40) if so, said triangle element can be defined as an average of the difference between said inputs set and said reference sets angle of the matching patterns (column 7, lines 1-44). Modifying George's method of triangle pattern matching

method according to Hsu would be able to provide an automatic pattern matching that able to discard the computation of parameters that do not satisfy conditions to reduce the operation time which will speed up the matching process (column 5, lines 35-41). This would improve processing and therefore, it would have been obvious to one of the ordinary skill in the art to modify George according to Hsu.

For claim 7, George further teaches the method wherein said fourth step further comprises converting said points to the new coordinate (page 456, first column, first paragraph). George teaches the determining the parameters of said geometric parameters. (page 456, second column, first paragraph). George does not explicitly teach the determining the four parameters of said geometric parameters.. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to determining whether four or different number of parameters of said geometric parameters. Applicant has not disclosed that the determining the four parameters of said geometric parameters provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with either the determining the four or different number of parameters of said geometric parameters. Therefore, it would have been obvious to combine to one of ordinary skill in this art to modify George with determining the four parameters of said geometric parameters to obtain the invention as specified in claim 7.

For claim 8, George further teaches the method wherein said similarity is determined by the combination of said weighting value and said points (Delaunay Triangulation matching) (page 455, first column, second paragraph).

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Referring to claim 9, George discloses the method wherein said similarity is simply an algebra function (page 456, second column, 4.4 the verification step, first paragraph).

### *CONCLUSION*

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respect to triangle/pattern/planar point pattern matching:

U.S. Pat. No. 5,392,367 to Hsu, teaches automatic planar point pattern matching device and the matching method thereof.

U.S. Pat. No. 5,991,430 to Hsu, teaches method and device for automatic matching of planar point patterns.

Zsolt Miklos Kovacs-Vajna, "A Fingerprint Verification System based on Triangular Matching and Dynamic Time Warping", I.E.E.E. Transactions on Pattern Analysis and Machine Intelligence, Vol. 22, No. 11 pages 1266-1276, November 2000.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Q Le whose telephone number is 703-305-5083. The examiner can normally be reached on 8:30 A.M - 5:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9306 for After Final communications.

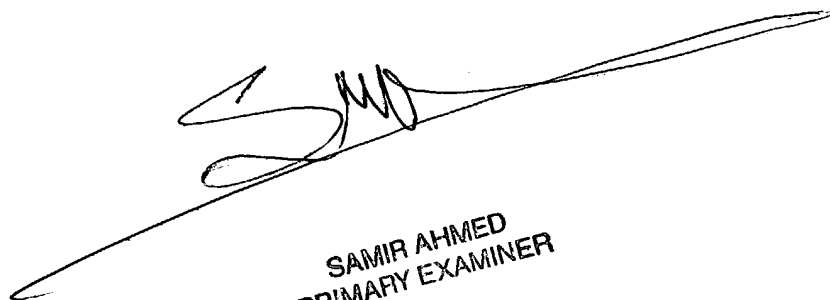


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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to TC Customer Service whose telephone number is 703-306-0377.

BL

November 4, 2004



SAMIR AHMED  
PRIMARY EXAMINER